SEQUENCE LISTING

<110> Eisenberg, Stephen P.
Case, Casey C.
Cox III, George N.
Jamieson, Andrew
Rebar, Edward J.
Sangamo Biosciences, Inc.

<120> Selection of Sites for Targeting by Zinc Finger Proteins and Methods of Designing Zinc Finger Proteins to Bind to Preselected Sites

<130> 019496-001800US

<140> US 09/229,007
<141> 1999-01-12

<160> 97

<170> PatentIn Ver. 2.1

<210> 1
<211> 25
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<222> (1)..(25)
<223> Xaa = any amino acid

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<222> (4)..(5)
<223> Xaa = any amino acid, may be present or absent

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<223> Xaa = any amino acid, may be present or absent

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Cys Xaa Xaa Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
1 5 10 15

Xaa Xaa His Xaa Xaa Xaa Xaa Xaa His
20 25

<210> 2
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<213> Artificial Sequence

<220>
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<400> 2
Thr Gly Glu Lys Pro
1 5

<210> 3
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<220>
<223> Description of Artificial Sequence:peptide linker

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Gly Gly Gly Gly Ser
1 5

<210> 4
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<223> Description of Artificial Sequence:peptide linker

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Gly Gly Arg Arg Gly Gly Gly Ser
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<210> 5
<211> 9
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<223> Description of Artificial Sequence:peptide linker

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<210> 7
<211> 16
<212> PRT
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<213> Mus sp.

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Tyr Ala Cys Pro Val Glu Ser Cys Asp Arg Arg Phe Ser Arg Ser Asp
1 5 10 15

Glu Leu Thr Arg His Ile Arg Ile His Thr Gly Gln Lys Pro Phe Gln
20 25 30

Cys Arg Ile Cys Met Arg Asn Phe Ser Arg Ser Asp His Leu Thr Thr
35 40 45

His Ile Arg Thr His Thr Gly Glu Lys Pro Phe Ala Cys Asp Ile Cys
50 55 60

Gly Arg Lys Phe Ala Arg Ser Asp Glu Arg Lys Arg His Thr Lys Ile
65 70 75 80

His Leu Arg Gln Lys
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Pro Gly Lys Lys Lys Gln His Ile Cys His Ile Gln Gly Cys Gly Lys
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Val Tyr Gly Lys Thr Ser His Leu Arg Ala His Leu Arg Trp His Thr
20 25 30

Gly Glu Arg Pro Phe Met Cys Thr Trp Ser Tyr Cys Gly Lys Arg Phe
35 40 45

Thr Arg Ser Asp Glu Leu Gln Arg His Lys Arg Thr His Thr Gly Glu
50 55 60

Lys Lys Phe Ala Cys Pro Glu Cys Pro Lys Arg Phe Met Arg Ser Asp
65 70 75 80

His Leu Ser Lys His Ile Lys Thr His Gln Asn Lys Lys Gly
85 90

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transcription factor consensus sequence

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Met Glu Lys Leu Arg Asn Gly Ser Gly Asp Pro Gly Lys Lys Lys Gln
1 5 10 15

His Ala Cys Pro Glu Cys Gly Lys Ser Phe Ser Lys Ser Ser His Leu
20 25 30

Arg Ala His Gln Arg Thr His Thr Gly Glu Arg Pro Tyr Lys Cys Pro
35 40 45

Glu Cys Gly Lys Ser Phe Ser Arg Ser Asp Glu Leu Gln Arg His Gln
50 55 60

Arg Thr His Thr Gly Glu Lys Pro Tyr Lys Cys Pro Glu Cys Gly Lys
65 70 75 80

Ser Phe Ser Arg Ser Asp His Leu Ser Lys His Gln Arg Thr His Gln
85 90 95

Asn Lys

<210> 11
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<220>
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binding site

<400> 11
gcgtgggcgc 10

<210> 12
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<220>
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<400> 12
ggntgnggnn 10

<210> 13
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<212> DNA
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<220>
<223> Description of Artificial Sequence:target site with two overlapping D-able subsites

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<210> 14
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<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site with three overlapping D-able subsites

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<210> 15
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<223> n = g, a, c or t, may be present or absent

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<210> 17
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<210> 19
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<400> 19
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<210> 20
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<400> 20
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<400> 21
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<210> 22
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<400> 22
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<210> 23
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<400> 23
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<210> 24
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<210> 25
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<400> 26
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<210> 27
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<400> 27
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<210> 28
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<400> 28
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<210> 29
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<210> 30
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<400> 30
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<210> 31
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motif searched by protocol 1

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<210> 32
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<210> 33
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motif searched by protocol 1

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<210> 34
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motif searched by protocol 1

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<210> 35
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motif searched by protocol 1

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<400> 35
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<210> 36
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motif searched by protocol 2

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<400> 36
knggnnknnn nnknggnnkn nn 22

<210> 37
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motif searched by protocol 2

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<210> 38
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motif searched by protocol 2

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<400> 38
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<210> 39
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motif searched by protocol 2

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<210> 40
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motif searched by protocol 2

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<210> 41
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motif searched by protocol 2

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<210> 42
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motif searched by protocol 2

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<400> 42
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<210> 43
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motif searched by protocol 2

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<210> 44
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motif searched by protocol 2

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<400> 44
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<210> 45
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<210> 46
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motif searched by protocol 2

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<400> 46
knnknggnnn nnknnknnkn gg 22

<210> 47
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motif searched by protocol 2

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<400> 47
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<210> 48
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motif searched by protocol 2

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<400> 48
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motif searched by protocol 2

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<400> 49
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motif searched by protocol 2

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<400> 50
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<210> 51
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<220>
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motif searched by protocol 2

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<400> 51
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<210> 52
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motif searched by protocol 2

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<400> 52
knnknnkngg nnknnknnkn gg 22

<210> 53
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<220>
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motif searched by protocol 2

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<400> 53
knnknnkngg nnnknnknnk ngg 23

<210> 54
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motif searched by protocol 2

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<400> 54
knnknnkngg nggnnknnn 19

<210> 55
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<220>
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motif searched by protocol 2

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knnknnkngg nnknggnnn 19

<210> 56
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motif searched by protocol 2

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<400> 56
knnknnkngg nnknnkngg 19

<210> 57
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motif searched by protocol 3

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<220>
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<223> n = g, a, c or t, may be present or absent

<400> 57
kngknnknnn nnkngknnkn nn 22

<210> 58
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 58
kngknnknnn nnnkngknnk nnn 23

<210> 59
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (10)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 59
kngknnknnn nnknnkngkn nn 22

<210> 60
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 60
kngknnknnn nnnknnkngk nnn 23

<210> 61
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (10)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 61
kngknnknnn nnknnknnkn gk 22

<210> 62
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 62
kngknnknnn nnnknnknnk ngk 23

<210> 63
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (10)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 63
knnkngknnn nnkngknnkn nn 22

<210> 64
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 64
knnkngknnn nnnkngknnk nnn 23

<210> 65
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (10)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 65
knnkngknnn nnknnkngkn nn 22

<210> 66
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 66
knnkngknnn nnnknnkngk nnn 23

<210> 67
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (10)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 67
knnkngknnn nnknnknnkn gk 22

<210> 68
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 68
knnkngknnn nnnknnknnk ngk 23

<210> 69
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 69
knnknnkngk nnkngknnkn nn 22

<210> 70
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (12)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 70
knnknnkngk nnnkngknnk nnn 23

<210> 71
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 71
knnknnkngk nnknnkngkn nn 22

<210> 72
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (12)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 72
knnknnkngk nnnknnkngk nnn 23

<210> 73
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(22)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (11)..(12)
<223> n = g, a, c or t, may be present or absent

<400> 73
knnknnkngk nnknnknnkn gk 22

<210> 74
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA
motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(23)
<223> n = g, a, c or t

<220>
<221> modified_base
<222> (12)..(13)
<223> n = g, a, c or t, may be present or absent

<400> 74
knnknnkngk nnnknnknnk ngk 23

<210> 75
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(19)
<223> n = g, a, c or t

<400> 75
knnknnkngk ngknnknnn 19

<210> 76
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(19)
<223> n = g, a, c or t

<400> 76
knnknnkngk nnkngknnn 19

<210> 77
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site DNA motif searched by protocol 3

<220>
<221> modified_base
<222> (1)..(19)
<223> n = g, a, c or t

<400> 77
knnknnkngk nnknnkngk 19

<210> 78
<211> 10
<212> DNA
<213> Glycine max

<220>
<223> soybean FAD2-1 cDNA ZFP target segment FAD 1

<400> 78
gaggtagagg 10

<210> 79
<211> 10
<212> DNA
<213> Glycine max

<220>
<223> soybean FAD2-1 cDNA target segment FAD 2

<400> 79
gtcgtgtgga 10

<210> 80
<211> 10
<212> DNA
<213> Glycine max

<220>
<223> soybean FAD2-1 cDNA target segment FAD 3

<400> 80
gttgaggaag 10

<210> 81
<211> 10
<212> DNA
<213> Glycine max

<220>
<223> soybean FAD2-1 cDNA target segment FAD 4

<400> 81
gaggtggaag 10

<210> 82
<211> 10
<212> DNA
<213> Glycine max

<220>
<223> soybean FAD2-1 cDNA target segment FAD 5

<400> 82
taggtggtga 10

<210> 83
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:test sequence

<400> 83
agtgcgcggt gc 12

<210> 84
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site
with base immediately to the 3' side of target
site

<400> 84
agtgcgcggt 10

<210> 85
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site
with base immediately to the 3' side of target
site

<400> 85
gtgcgcggtg 10

<210> 86
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site
with base immediately to the 3' side of target
site

<400> 86
tgcgcggtgc 10

<210> 87
<211> 10
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:target site with base immediately to the 3' side of target site

<220>
<221> modified_base
<222> (10)
<223> n = undefined

<400> 87
gcgcggtgcn 10

<210> 88
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:finger F3 for ordered output from optimal design target site

<400> 88
Glu Arg Asp His Leu Arg Thr
1 5

<210> 89
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:finger F2 for ordered output from optimal design target site

<400> 89
Arg Ser Asp Glu Leu Gln Arg
1 5

<210> 90
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:finger F1 for ordered output from optimal design target site

<400> 90
Arg Lys Asp Ser Leu Val Arg
1 5

<210> 91
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:finger for disordered output from optimal design target site

<400> 91
Arg Ser Asp Glu Leu Thr Arg
1 5

<210> 92
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:finger for disordered output from optimal design target site

<400> 92
Arg Ser Asp Glu Arg Lys Arg
1 5

<210> 93
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:three finger ZFP design using F3, F2 and F1 fingers for ordered output from optimal design target site

<400> 93
Arg Lys Asp Ser Leu Val Arg Arg Ser Asp Glu Leu Gln Arg Glu Arg
1 5 10 15

Asp His Leu Arg Thr
20

<210> 94
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:ZFP sequence (F1, F2 and F3) from SBS design GR-223

<400> 94
Arg Ser Ala Asp Leu Thr Arg Arg Ser Asp His Leu Thr Arg Glu Arg
1 5 10 15

Asp His Leu Arg Thr
20

<210> 95
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:ZFP sequence
(F1, F2 and F3) from Zif 268

<400> 95
Arg Ser Asp Glu Leu Thr Arg Arg Ser Asp His Leu Thr Thr Arg Ser
1 5 10 15

Asp Glu Arg Lys Arg
20

<210> 96
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:ZFP sequence
(F1, F2, F3) from SP1

<400> 96
Lys Thr Ser His Leu Arg Ala Arg Ser Asp Glu Leu Gln Arg Arg Ser
1 5 10 15

Asp His Leu Ser Lys
20

<210> 97
<211> 21
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:ZFP sequence
(F1, F2, F3) from SBS design GL-8.3.1

<400> 97
Arg Lys Asp Ser Leu Val Arg Thr Ser Asp His Leu Ala Ser Arg Ser
1 5 10 15

Asp Asn Leu Thr Arg
20